"The Committee...finds that much regarding DOE's intended reliance on long-term stewardship is

1 Prepared by Ross & Associates Environmental Consulting, Ltd., for submission under Contract with the National Governors' Association Center for Best Practices. The preparation of this document was financed in part by funds provided by the U.S. Department of Energy, Grant instrument no. DE-FG26-97FT34337.

at this point problematic." This study argues that while LTS is essential, a much broader-based, more systematic approach is needed. For any given site, contaminant reduction, contaminant isolation, and stewardship should be treated as an integrated, complementary system: one that requires foresight, transparently clear and realistic thinking, and accountability. Today's waste management actions should become an integral part of stewardship planning. ..."No plan developed today is likely to remain protective for the duration of the hazards."

Applegate, John and Stephen Dycus. November 1998. *Institutional Controls or Emperor's Clothes? Long-Term Stewardship of the Nuclear Weapons Complex*. ENVIRONMENTAL LAW REPORTER News & Analysis 28(11) ELR 10631-10652.
http://lts.apps.em.doe.gov/center/reports/pdf/doc42.pdf

In this thought-provoking paper, the authors find that the statutory framework (primarily CERCLA and RCRA) for addressing long-lived wastes fails to impose effective restrictions on the future use of contaminated property and does not establish the types of institutions that are necessary to manage long-lived wastes. The authors further conclude that existing institutional controls are not likely to be effective over the long term. They therefore advocate the development of new legal instruments, procedures for current decisionmaking, and stewardship institutions that will ensure successful long-term management of long-lived waste. They also set forth a set of characteristics that would enable an effective LTS program. The authors are both professors of law and members of DOE's Environmental Management Advisory Board, Long-Term Stewardship Committee.

Environmental Law Institute and Energy Communities Alliance. 2001. *The Role of Local Governments in Long-Term Stewardship at DOE Facilities.* 166pp. (Contact: Seth Kirshenberg (ECA) or Jay Pendergrass (ELI)). Www.eli.org

A useful synthesis of information and viewpoints on LTS from local government perspective, this report includes policy recommendations emerging from case studies of Rocky Flats, Los Alamos, and Oak Ridge.

II. FULL LIST OF DOCUMENTS, ARRANGED BY ORGANIZATION

US Department of Energy (DOE)-Headquarters

DOE Office of Environmental Management (EM). October 1999. *From Cleanup to Stewardship: a Companion Report to Accelerating Cleanup: Paths to Closure*. DOE/EM-0466. 57 pp. Plus appendices. [Annotated above]

DOE Office of Long-Term Stewardship (EM-51), October 2000. *Long Term Stewardship Study-Draft*. Notice of Availability: 65 FR 64934, 10/31/2000. [Annotated above]

DOE Office of Long-Term Stewardship (EM-51). January 2001. *Report to Congress on Long-Term Stewardship. Volume 1-Summary Report.* 194 pp. *Volume 2-Site Summaries.* DOE/EM-0563. (Contact: Jonathan Kang, EM-51) [Annotated above.]

DOE Office of Long-Term Stewardship (EM-51). January 2001. *Long-term Stewardship Implementation Plan Guidance, Draft.* 92 pp. http://lts.apps.em.doe.gov/center/stewlink0.asp

Preliminary draft. A significantly revised draft is expected April 17, 2001 (see forthcoming)

DOE. January 2001. "Interim Policy for the Department of Energy's Use of Institutional

This guidance is intended to provide information on institutional controls to DOE environmental restoration project managers for making remedy decisions under CERCLA and RCRA. The document describes the federal and state regulatory framework, evaluates types of ICs that would apply based on whether DOE is retaining or transferring the land, or allowing use by non-DOE entities; and provides basic information about how and when to select appropriate ICs in the full context of regulators, stakeholders, and site-specific conditions. (Contact: John Bascietto, EH-413)
cf. EPA's *Institutional Controls: A Site Managers Guide . . .* … September 2000, below.

DOE-Ohio Field Office, Susan R. Brechbill, Manager. March 27, 2000. "Guiding Principles for LTS." 2 pp. http://lts.apps.em.doe.gov/center/reports/pdf/doc198.pdf

Outlines six principles for DOE-Ohio sites to embrace during development of LTS Plans: Stakeholder and Regulator Involvement; Institutional Controls; Funding; Review of Remedy;

Technological Opportunities; and Pooling Resources. Quote from institutional controls: "Given that the final step in the cleanup process is making sure that the administrative controls and use restriction are not lost over time, LTS commitments for 'knowledge/data management' may, in fact, be one of the Department's most challenging obligations." From funding: "The cost-benefit of any potential LTS action should be evaluated at the time of remedy selection."

US Environmental Protection Agency (EPA)

US EPA OSWER. September 2000. ***Institutional Controls: A Site Manager's Guide to Identifying, Evaluating and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups*****. 30 pp. EPA-540-F-00-005**. Http://www.epa.gov/oerrpage/superfund/resources/institut/guide.pdf

This fact sheet provides EPA site managers with an overview of the types of ICs that are commonly used, and outlines the factors that should be considered when evaluating and selecting ICs as part of a remedy. Summarizes legal mechanisms for imposing ICs. Covers all cleanups, including those at federal facilities. Includes sections on determining the role of states and local governments. Includes several references to: Institutional Controls: A Reference Manual"(see below). Includes a checklist for implementing ICs as well as an extensive table of ICs with their benefits, limitations, and enforcement mechanisms.

[From the Assistant Administrator's letter of transmittal:] "Some of the key messages from this fact sheet are: 1) if the cleanup does not result in unrestricted use and unlimited exposure at a site, an IC is likely appropriate, 2) understand the life-cycle strengths, weaknesses and costs for implementation, monitoring and enforcement before choosing an IC, 3) coordinate early with all state and local governments that may have responsibilities for the ICs, 4) evaluate ICs as rigorously as you would any other remedial alternative, 5) layer and/or place ICs in series to increase their reliability, 6) when writing decision documents, make sure that the objective(s) of the IC are clear, 7) get assurances (in writing if possible) from entities that will be responsible for implementing, monitoring, and enforcing ICs, and 8) remember that since all ICs have weaknesses, the role of the decision maker is to select the best ICs to protect human health and the environment."

US EPA. February 2000. ***Institutional Controls and Transfer of Real Property under CERCLA Section 120(h)(3) (A), (B) or (C).*** **9 pp.** (Contact: Allison Abernathy, EPA-Fed.Facilities Restoration and Reuse Office) www.epa.gov/swerffrr/fi-icops.106.wpd

This document provides guidance on the exercise of EPA's discretion for property to be transferred under CERCLA section 120(h)(3)(A),(B), or (C) when EPA is called upon to evaluate institutional controls as part of a remedial action. The guidance provides guidelines applicable to property transfers in general and, more specifically, to support "operating properly and successfully determinations" under CERCLA section 120(h)(3)(B). The guidance does not address the issue of whether an institutional control is appropriate for a particular site.

US EPA, Workgroup on Institutional Controls. March 1998. ***Institutional Controls: A Reference Manual*****. Working Draft. 87 pp. plus appendices.** (Contact: Stephen Hess. EPA Office of General Counsel) (Not available online.)

This manual was prepared for use by EPA staff involved in evaluating and implementing institutional controls in cleanup programs–primarily CERCLA and RCRA. It is not intended as Agency guidance. It identifies the kinds of legal and other vehicles that can serve as ICs and discusses in detail the legal and practical considerations that may arise in putting such controls in place. It includes a section on ICs and federal facilities. While useful for both program and legal

US DoD. February 1998. "A Guide to Establishing Institutional Controls at Closing Military Installations." 10 pp. http://www.dtic.mil/envirodod/brac/icguide.html

A straightforward guide for what to do at DoD facilities when restoration or reuse alternatives under consideration may require "some sort of control or limit on use of the property." Emphasizes the necessity for community acceptance of ICs. Recommends formation of a multi-stakeholder team to

This document provides a compilation of the results of a survey of State Cleanup Programs to determine the extend that ICs are used nationally, and to determine the successes and issues surrounding their use. Specific response information is shown for each of the 42 responding states. Topics of survey questions included the degree of community/local involvement in establishing ICs; the enforcement, tracking, funding of ICs; how ICs are used at National Priorities List sites; whether ICs are considered takings; and perceived obstacles to successful use of ICs. Among the findings: deed restrictions, deed notices, land use restrictions, and water use restrictions are the most common forms of ICs used. Hazardous substance easements, a fairly new mechanism, were used in three responding states. Most states indicated that ICs had not been used long enough to determine whether they will be effective in preventing exposure in the long run. The vast majority of information on ICs was managed, maintained, and controlled through local property records. Thirteen states had a registry or database for tracking and recording ICs.

Rocky Flats Stewardship Working Group. March 2001. ***Hand-in-Hand: Stewardship and Cleanup.*** **Report from Rocky Flats Stewardship Working Group to the Rocky Flats Coalition of Local Governments and the Rocky Flats Citizens Advisory Board.** (Contact: c/o Steve Tarlton, CDPHE)

The purpose of this report is to emphasize the importance of incorporating LTS into the remedy selection process, and to offer guidance as to how this incorporation can best be accomplished. The document presents a draft stewardship "toolbox," developed to help identify and organize the LTS activities necessary for an effective program so that they may be systematically considered during remedy selection. Identifies the six major stewardship tools as: (1) physical controls, (2) institutional/administrative controls, (3) monitoring/maintenance, (4) information management, (5)

This study examined the ongoing decision-making process at Mound, and the options being considered in order to aid DOE's and the public's understanding of ICs. The study found that deed restrictions were the primary IC considered, and that the analysis of other approaches was limited. It also found that some reuse and cleanup decision were being made prior to the identification and development of ICs, possibly making it more difficult to impose some forms of IC, such as covenants, that depend on legal priority and specific relationships between grantors and grantees, and among grantees of parcels of land. There was substantial public involvement in decision-making about ICs at Mound.

Environmental Law Institute. 1999. *Institutional Controls Case Study: Grand Junction.* 34 pp.
http://www.eli.org/contracts/rr99grandjunctioncontract.htm

This study examined the status of institutional controls at the Climax Uranium mill site in Grand Junction, Colorado. This site is an UMTRA project site under the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978. The statute provides for annotation of land records. The researchers found that the state, DOE, real estate professionals, lenders and property owners have opposed annotating land records of vicinity properties (sites where tailings were used for construction or deposited through erosion). They also found that the voluntary nature of the UMTRA program has resulted in "anomalous gaps" in the protection provided by ICs because property owners could refuse to have their property evaluated or cleanup up under the program.

Environmental Law Institute. 1999. *Protecting Public Health at Superfund Sites: Can Institutional Controls Meet the Challenge?* 134 pp. ISBN #0-911937-85-4.
http://www.eli.org/contracts/rr00institutionalcontrolscontract.htm

This study consists of four in-depth case studies of NPL sites where there has been experience selecting and implementing various types of institutional controls. Sets forth recommendations for (a) intergovernmental coordination, (b) selection of ICs, (c) long-term monitoring and enforcement, and (d) public awareness and participation.

[From the conclusion:] "These case studies demonstrate that there are many obstacles to the long-term effectiveness of [ICs]. ... Unless there is improvement in the use of [ICs] it is likely that [ICs] will continue to fail at some sites and that eventually one or more of these failures will cause people to be exposed to residual hazardous substances."

Joint Institute for Energy & Environment. May 2000. *Reducing the Nuclear Legacy Burden: DOE Environmental Management Strategy and Implementation.* Author: Milton Russell. 60pp. JIEE-00-01. www.jiee.org/SPO/spo.html

The author argues that DOE's goal as agent for the public should be to minimize the joint risk and cost burden on this and future generations. He advocates switching from a physical ("cleanup") transformation mindset to one of minimizing the legacy burden. The legacy burden includes the value of both the direct harmful *effects borne* and of the *resources absorbed and other harms incurred* in reducing such effects. This paper provides a strategy that emphasizes implementation of necessary trade-offs while achieving equity within this and succeeding generations.

Joint Institute for Energy and Environment. July 1997. *Institutional Controls at Superfund Sites: A Preliminary Assessment of Their Efficacy and Public Acceptability*. Authors: Dr. Mary English, David L. Feldman, et al. University of Tennessee, Knoxville. 100 pp. JIEE Report 97-02. (Full text not available online)

The lead author served as vice chair of the National Academy of Sciences' Committee on Remediation of Buried Tank Wastes in producing their recent report (NRC, 2000).

[From the abstract:] This report provides a preliminary assessment of the public acceptability and efficacy of institutional controls at Superfund sites. Based on a review of the literature and the study's empirical findings, there is good reason to be concerned about the viability of institutional controls, as they are currently employed. The study offers six conclusions and recommendations for EPA and others to consider:

1. It might be useful for EPA to more systematically create an "institutional memory" of attitudes toward institutional controls at Superfund sites;
2. Factors that strongly and consistently deter the public acceptability of institutional controls should be explored and uncovered;
3. Confirmation needs to be obtained on the factors that appear to promote the public acceptability of institutional controls;
4. Combinations of factors and their perceived impacts may help shape public attitudes concerning the public acceptability of institutional controls;

The authors examine three types of trusts: federal, state, and private, and evaluate them against five criteria for their effectiveness for funding long term stewardship at federal and other contaminated sites. They conclude that, on balance, **private charitable trusts** appear to be the best option for funding LTS. Federal "trust funds" are specifically not recommended. This report does not address where the money to capitalize a trust would come from, except to say that it is unclear whether federal agencies have authority to finance state or private trusts.

Probst, Katherine N., and Michael H. McGovern. June 1998. ***Long Term Stewardship and the Nuclear Weapons Complex: the Challenge Ahead*****. 67 pp. ISBN 0-915707-97-7**.
http://www.rff.org/reports/PDF_files/stewardship.pdf

This is a thoughtful study that begins with a description of the waste legacy and institutional legacy from the cold war, and the key functions of a long-term stewardship program. Drawing on an analogy with cemetery preservation and maintenance, the authors then examine a number of factors essential to creating a successful LTS program. They argue in favor of creating an enduring stewardship mandate through federal legislation amending CERCLA or RCRA or enacting stand-alone legislation. They examine candidate federal agencies for implementing LTS (including DOE, EPA, Corps, and BLM), and conclude that there is no obvious best candidate, pending decisions about whether the scope of LTS is DOE sites only or all contaminated sites. Having concluded that another

component of a successful LTS program is an effective mechanism for ensuring external accountability, they examine several models for this and further conclude that external accountability may be best served by some sort of joint oversight, conducted by the federal and state government. They provide additional recommendations for next steps and specific topics for further study, including a recommendation for EPA to commission a study examining the role of state and local governments as stewardship implementors and/or overseers. Among the appendices, one enumerates the relevant features of the various federal environmental programs with stewardship elements.

INTERNATIONAL ORGANIZATIONS

International Atomic Energy Agency (IAEA). July 1999. *Maintenance of records for radioactive waste disposal*. IAEA-TECDOC-1097. 33 pp. http://www.iaea.org/worldatom/Books/TecDoc/

This report provides guidance for preserving information about near surface and geological repositories for radioactive waste including long-lived and transuranic waste and spent fuel if it is declared as a waste. The report discusses the identification, transfer, and long term retention of high-level information pertaining to the repository in a records management system (RMS) for retrieval if it becomes necessary in the future. The report recommends a three-level, hierarchical structure for storage of information at varying levels of detail and at multiple locations.

OTHER ARTICLES & PUBLICATIONS

Applegate, John, and Steve Dycus. November 1998. "Institutional Controls or Emperor's Clothes? Long-Term Stewardship of the Nuclear Weapons Complex," *Environmental Law Reporter* News & Analysis 28 ELR 10631-10652. [Annotated above.]

Brand, Stewart. June 2000. *The Clock of the Long Now: Time and Responsibility*, Basic Books. 200 pp.

From *Library Journal*: "(The author) takes on civilization's "pathologically short attention span" with a proposal to encourage us all to assume long-term responsibility for the continuation of the human species. How to do this? By creating both a myth and a mechanism with which to counter our short focus these days, which Brand names as the core of the problem. He spends the remainder of this rumination clarifying that thought and outlining the details of the myth and mechanism that he suggests as a catalyst: a clock that ticks once a year, bongs once a century, and cuckoos but once a millennium." From the book jacket: "*The Clock of the Long Now* tackles the necessary and "timely" question of how to make long-term thinking an integral part of our fast-paced lives."

ICF Kaiser. March 1998. *Managing Data for Long-Term Stewardship*, working draft. (Contact: Bob Hegner, ICF.) Commissioned by US DOE. http://lts.apps.em.doe.gov/center/reports/doc1.html

Findings: 1. Most types of information needed for long-term stewardship are already being generated for other purposes.

2. Requirements do not specifically identify what constitutes stewardship data or how to define this discrete subset.

3. Information management requirements and practices are not coordinated with property transfer requirements.

4. Information that has stewardship value is being lost, destroyed, or maintained in formats that may not be useful to future stewards.

5. Some data will not be preserved as long as necessary for stewardship purposes.

6. Some data will be preserved adequately but may not be able to be located, or will not be accompanied by enough descriptive information to be usable.

7. Most records of facilities and site infrastructure are required to be destroyed when facilities are

demolished or infrastructure is declared obsolete.
8. DOE has already begun to pay increased cleanup costs because critical data have been lost.
9. Knowledge that archived information about DOE sites exists may be lost.
10. Future users may not know where to search for all relevant information, causing delays in action or the potential for unnecessary risk.
11. Even when such knowledge is preserved, and users know where information is located, it may take too long or be too expensive to gain access to stewardship data.

Pasqualetti, Martin J. 1997. "Landscape Permanence and Nuclear Warnings," THE GEOGRAPHIC REVIEW 87(1): 73-91.

[Abstract] From the perspective of a human lifetime, the hazards of some nuclear wastes are permanent, so the warnings we place at contaminated nuclear sites must be permanent too. I address questions of how best to provide one hundred centuries of public warning at the first facility for permanent disposal, the Waste Isolation Pilot Plant in New Mexico. Scenarios of intrusion developed to guide the design of warning markers predicted that most of the changes in the area will be social and cultural. Because blatant and permanent markers will increase, not reduce, the probability of inadvertent intrusion, the most appropriate warning is a "landscape of illusion." Such a landscape needs no permanent surface markers but underground warning devices beneath a soft surface marker. No warning can guarantee deterrence for 10,000 years, however.

CONFERENCE PROCEEDINGS

***Meeting Summary*. Eleventh Technical Information Exchange Workshop**, Las Vegas, NV, October 27, 1999. Session XVII: Stewardship Panel Session, chaired by John C. Stewart, DOE-HQ. 9 pp. http://lts.apps.em.doe.gov/center/reports/pdf/doc191.pdf

DOE-Grand Junction Office. Third Annual LTS Workshop. August 7-10, 2000. Denver.
http://www.doegjpo.com/programs/ltsm/general/workshophighlights.htm

The Fourth Annual LTS Workshop is scheduled for July 30-August 2, 2001, in Grand Junction.

Energy Communities Alliance (ECA). Stakeholder forums on Land Use Controls. West coast forum 1999, East coast forum June, 2000.

ECA/ELI, April 8-9, 1999, *Highlights*: ECA/ELI Local Government Long-Term Stewardship Meeting, Westminster, CO. http://www.energyca.org/WestminsterMeetingHighlights.html

ECA/ELI, August 2-4, 2000, *Roundtable Minutes*: Role of Local Government in Long-Term Stewardship and Institutional Controls Project , Denver.
http://www.energyca.org/DenverRoundtableMinutes.pdf

Site Specific Advisory Board (SSAB) Stewardship Workshop, October 26-27, 2000, Denver.

Waste Management 2000 Symposium (Tucson), session on stewardship, February 29, 2000.
http://lts.apps.em.doe.gov/center/reports/ppt/session1/wm2000session1_files/ppoint.pdf
Waste Management 2001 Symposium (Tucson), sessions on stewardship, February 27 and March 1, 2001. http://www.wmsym.org/

Workshop to Address Management of Contaminated Federal Facilities. December 13-15, 2000, San Francisco. http://www.pacific-rim.org/calconf/Summary.htm

FORTHCOMING DOCUMENTS

DOE Office of Long-Term Stewardship (EM-51). Forthcoming. ***Long Term Stewardship Study-Final*****.** Expected April 2001. (Contact: Tish O'Connor, EM-51)

DOE Office of Long-Term Stewardship. ***Long-term Stewardship Implementation Plan Guidance, Draft*****.** A significantly revised, but still preliminary, draft is expected April 17, 2001. (Contact: Jonathan Kang, EM-51) http://lts.apps.em.doe.gov/center/stewlink0.asp

This guidance is intended to assist DOE field offices in the preparation of site specific stewardship plans and is scheduled to be finalized by October 1, 2001.

DOE. Forthcoming. Long-Term Stewardship Strategic Plan. (Contact: Julie Connor, DOE-Idaho)

Drafts of a Strategic Plan have been circulated internally within DOE. The department is developing a new draft of this document.

National Association of Attorneys General (NAAG). Survey of state laws and regulations applicable to LTS. (Contact: Paula Cotter, NAAG)